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Premature ventricular complexes ablation: A trip to the accuracy

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Classically, premature ventricular contractions (PVC) have been considered relatively benign in the absence of structural heart disease. However, frequent PVC may result in left ventricular systolic dysfunction, a form of PVC-induced cardiomyopathy or PVC-mediated deterioration of pre-existing cardiomyopathy [1]. Frequent PVCs have been associated with a more than 2-fold higher risk of cardiovascular outcomes including stroke and mortality in some reports [2, 3]. Radiofrequency ablation (RFA) is increasingly being used in the treatments of symptomatic or frequent PCV.

Some authors have reported that catheter ablation appears to be more effective than antiarrhythmic drugs in PVC frequency reduction and left ventricular ejection fraction normalization [4].

Electroanatomic mapping systems can be helpful, especially when multiple chambers need to be mapped and compared. Activation mapping is ideal for focal PVC and is done with point-by-point mapping if PVC frequency is adequate. Alternatively, with a multielectrode catheter, multiple points can be acquired in a single beat when the PVC is very infrequent (non-contact EnSite Array™, St. Jude Medical, St. Paul, Minnesota, USA).

In the current issue of "Cardiology Journal", Dubner et al. [5] examined the utility of radiofrequency catheter ablation with a non-contact mapping system EnSite Array™ in patients with frequent PVC.

The investigators included 18 patients with frequent PVC (> 6,000/24 h) who underwent PCV ablation mostly as a second line procedure. Eighty-eight point eight percent of the patients had no structural heart disease and 38% of them presented with ventricular tachycardia (VT) (25% non sustained VT and 13% monomorphic VT). The authors reported an acute success rate of 93.7% with a low complication rate.

Li Zhong et al. [4] compare the relative efficacy of RFA and antiarrhythmic drugs (AADs) on PVC burden reduction increasing left ventricular systolic function.

Five hundred and ten patients with frequent PVC (> 1,000/24 h) were treated either by RFA or with AADs. The authors report that an acute RFA success rate was 94%, defined as the elimination of PVCs at the end of the procedure [4]. The rate of acute success rate was very similar to reported by Dubner et al. [5]. It should be noted that in Li Zhong et al. [4] series, the RFA was done using a 3-dimensional electroanatomic mapping (Carto System, Biosense Webster, Inc., Diamond Bar, California, USA) without any non-contact mapping.

Perhaps it would have been helpful to include a control group (without no contact mapping system) to compare if the non-contact mapping improves the efficacy and safety of the procedure in Dubner's series.

Because RFA of PCV is time consuming, it would be also interesting to know if the non-contact mapping system group procedure duration is shorter, because this would turn into a valuable tool to the electrophysiologist.

A limitation of ARRAY system is the fact that its accuracy decreases significantly if the location of the PCV is away from the right ventricular outflow tract (RVOT), so it is essential to be certain about the PVC location before starting this procedure.

The surface electrocardiogram (ECG) is a simple tool that can provide clues with respect to the

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location of a ventricular ectopic focus, PVC arising from the RVOT typically exhibit left bundle branch block configuration with an inferior axis.

Several studies investigated various ECG algorithms for precise localization of outflow tract ventricular arrhythmias [6, 7].

Yet, most of the published series are of few patients, retrospective, and the prevalence of left PVC is highly variable.

For instance, one simple criterion such as transitional zone, showed a relatively low predictive value especially in patients with R/S transition in the lead V3 with sensitivity and specificity of 55% and 38%, respectively [8]. These groups of patients are a real challenge for the future of PVC ablation. The ECG is a useful tool to identify the location of PVC origin, but it is not specific enough to determine the PVC origin accurately.

Taking everything into account, PCV ablation is a technique whose use will increase over the years. The new technologies aim to improve the accuracy of the location of the ventricular ectopic focus. Perhaps new technologies should include ECG criteria and activation mapping. Non-contact mapping system is a tool that helps ablate PVC: a trip to the accuracy has begun.

Conflict of interest: None declared

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